The Australian National University–National Museum of Vanuatu Archaeology Project: A Preliminary Report on the Establishment of Cultural Sequences and Rock Art Research

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THE AUSTRALIAN NATIONAL UNIVERSITY has a history of involvement in the archaeology of Vanuatu (Fig. 1) dating back to 1972, when Les Groube carried out a series of surveys and excavations on the islands of Erromango and Aneityum in the south and very briefly on the Banks Islands in the north (Groube 1972). Norma McArthur also carried out fieldwork on Aneityum in 1973, which contributed to her 1974 Ph.D. thesis on the island's historical demography (McArthur 1974). Rock art research was carried out on Aneityum in 1973 when Winifred Mumford, who accompanied McArthur, branched into the field (Spriggs and Mumford 1992). The above research, concentrated in the southern islands, was followed by Graeme Ward's Ph.D. fieldwork in the Banks Islands from 1973 to 1975 (Ward 1979).

Ward was followed by Matthew Spriggs, who conducted fieldwork in Vanuatu between 1978 and 1980. This led to a Ph.D. thesis concentrating on agricultural intensification and human impact on the environment of Aneityum, the southernmost inhabited island of the archipelago, as well as an ethnoarchaeological study of irrigation systems on the northern island of Maewo (Spriggs 1981). Spriggs took the then-heretical view that in certain respects prehistoric human-accelerated erosion was beneficial, creating the large coastal plains on which much of the population of Pacific islands live (see Spriggs 1984, 1997*a*). As part of that project, the first pollen analysis for Vanuatu was carried out by Geoff Hope. It revealed vegetation clearance on a massive scale at about 1000 B.C. (Hope and Spriggs 1982). Large-scale erosion and subsequent valley infilling have created problems for modern archaeologists looking for early sites. On Aneityum

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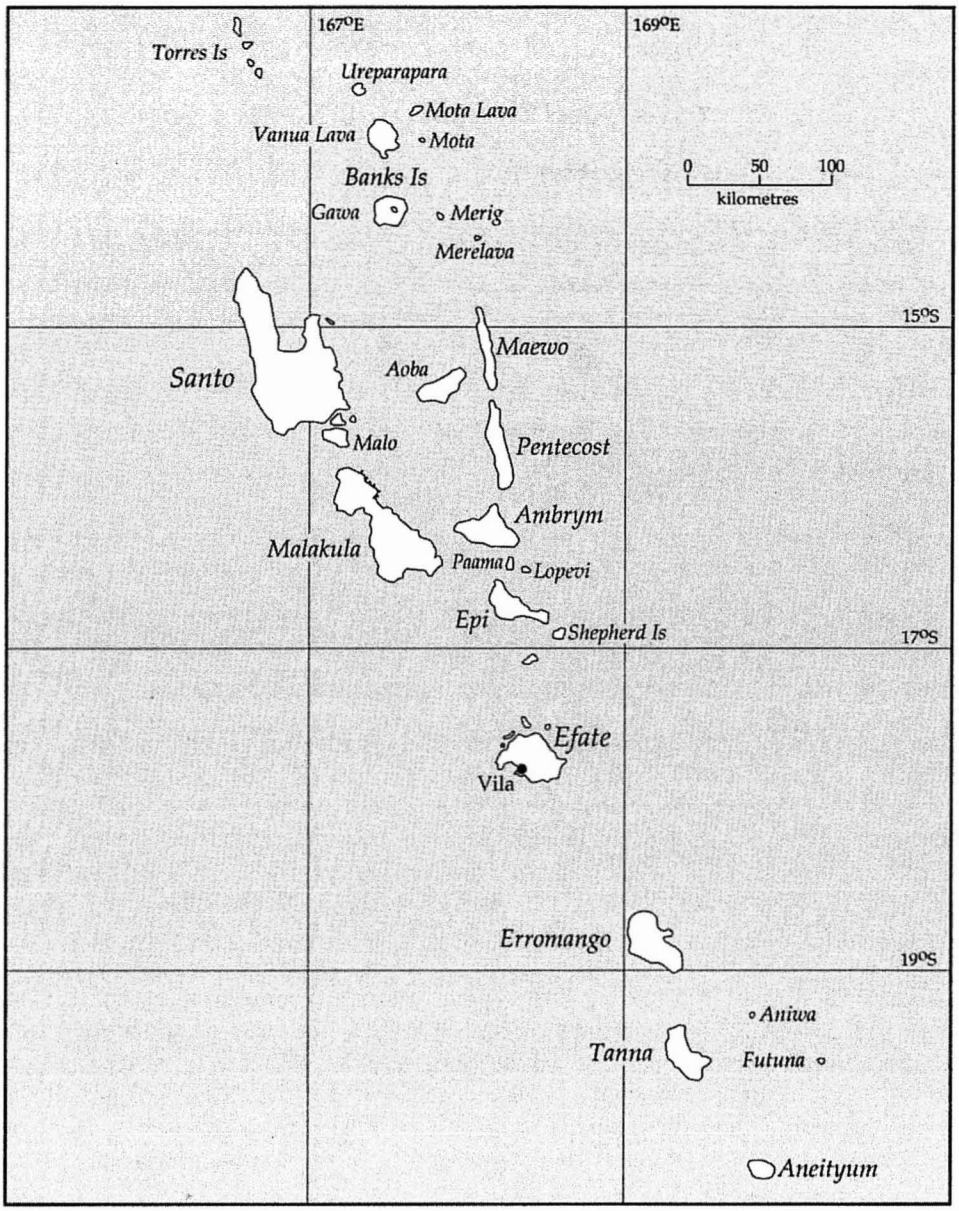

Fig. 1. Vanuatu.

Spriggs saw no land surface in alluvial sections older than 2000 years, meaning that at least 1000 years of history was missing. No pottery has ever been found on the island.

In 1983 Spriggs commenced a project on Erromango, assisted by Vanuatu National Museum fieldworker Jerry Taki, who had earlier worked with Les Groube. The aim was to search for evidence of human presence in southern Vanuatu earlier than 2000 B.P. The uplifted coral reef terraces on the east coast of

the island were not covered by alluvial deposition, and it was hypothesized that Lapita and other early pottery sites would be found there. Locations near reef passages and freshwater sources at rivermouths were targeted, following the model of Lapita site location developed by Frimigacci (1980) for New Caledonia. The series of surveys and several excavations located the first in situ pottery recovered from southern Vanuatu. The recovered pottery is largely composed of a regional variant of the Mangaasi tradition with a smaller Lapita component, dating to around 350 B.C. (Spriggs and Wickler 1989).

Combining the initial results from Erromango with a summary of artifact forms and a consideration of what he termed "transitional" sites, Spriggs (1984) published an article in *Journal of Pacific History* challenging the idea that Lapita and Mangaasi were two separate pottery traditions and, in some people's minds, two separate migrations. In this he was following a hypothesis first canvassed as a Melanesia-wide phenomenon by Jean Kennedy (1982). Spriggs argued that there was a developmental sequence from Lapita to Mangaasi with a series of transitional sites showing features of both. The article pulled together emerging evidence from the Bismarcks through to Fiji. The hypothesis was recently further investigated by Ephraim Wahome (1998), who extended the analysis on the basis of the Manus pottery sequence compared with published sources for other areas. Wahome showed that the pottery sequences in Melanesia basically went through similar sequential changes of form and decoration from their beginning with Lapita through to A.D. 450 in the areas where pottery survived that long. After that period, the gaps in distribution of pottery-making centers were such that contact among them was no longer maintained. The potters no longer saw each other's work and a rapid localization of styles eventuated (see also Spriggs 1997*b*: 152–186).

Although it is discussed in further detail in the Efate section of the paper, it seems appropriate to briefly mention here the Mangaasi ceramic tradition. This ceramic tradition, which is largely defined by its incised and applied relief decoration, was recovered by José Garanger (1972) from the central islands of Vanuatu. It was assigned the name Mangaasi after the site excavated on the west coast of Efate where Garanger undertook extensive excavations. Garanger argued that the tradition appeared around 600 B.C., had survived for up to 2000 years, and could be divided into early and late periods. It was thought to represent a separate and distinct pottery tradition that was contemporary with or predated Lapita in Vanuatu (Garanger 1972; Green 1979); some authors suggest that its origins lay in mainland Papua New Guinea (Gorecki 1992). Many of Garanger's assertions for the Mangaasi tradition have been questioned, notably by Ward (1989), and the recent excavations at the Mangaasi site were designed to clarify the chronology of the ceramic material.

THE 1994–1997 PROJECT

In 1994, after a ten-year moratorium, archaeological research began again in Vanuatu, with the archaeology of Erromango being initially targeted. Studies were extended to the islands of Malakula (1995) and Efate (1996) and concentrated on establishing cultural sequences for these islands. Initially the principal researchers involved from the Australian National University were Spriggs and

Stuart Bedford. In 1995 Nicola van Dijk joined the team to undertake a study of human remains in burial caves on Erromango. In 1995 Spriggs returned to Aneityum for further research on human-environmental relations with palynologist Geoff Hope and geologist Brad Pillans. Hope has also extended pollen research to Efate and Erromango.[1] The project was further expanded in 1996–1997 to include a study of Vanuatu rock art by Meredith Wilson.

Despite the pioneering efforts of the Shutlers and Garanger in the 1960s (Garanger 1972; Shutler and Shutler 1966, 1975) and later work by researchers such as Hedrick (n.d.), Ward, and Spriggs, and more recently the Vanuatu Cultural and Historic Sites Survey (VCHSS),[2] established by Jean-Christophe Galipaud and David Roe, many basic questions about Vanuatu archaeology remain unanswered. With the partial exception of central Vanuatu, known from Garanger's work (1972), no reasonably complete cultural sequences were available from any area of Vanuatu prior to the current project. This was a particular inconvenience for the conduct of the VCHSS, since lack of pottery or other artifact chronologies made it hard to assess the archaeological significance of sites where surface collections were made during surveys. The current project aims to rectify this by producing basic cultural sequences for particular islands in southern, central, and northern Vanuatu. Related to this is the construction of parallel sequences of environmental change, based on pollen cores from a range of coastal and inland areas of the archipelago and geomorphological studies. One of the objectives of the rock art recording project is to establish a chronological framework and to attempt to relate that to the archaeological results, particularly the recovered ceramics.

A question raised by the Lapita Homeland Project (Allen and Gosden 1991) and more directly by Wickler's demonstration of a 29,000-year prehistory for the Solomon Islands (Wickler and Spriggs 1988; Wickler 1995), was whether Vanuatu also had a pre-Lapita and possibly Pleistocene prehistory. Investigating this possibility was a further aim of the ANU-National Museum project. The high rates of uplift recorded for islands such as Erromango and Malakula made them attractive research foci in this regard.

Although much of the excavated archaeological material and recorded rock art is in the initial stages of analysis, general conclusions can be presented. This paper gives an overview of the preliminary results and includes a large number of radiocarbon dates and a lesser number of AMS dates that have been generated from the research.[3] Progress has been made both in establishing ceramic sequences from a number of islands in Vanuatu and in assessing the likelihood of pre-Lapita settlement in the archipelago.

Extensive surveys of the rock art of Vanuatu have been completed and a preliminary temporal sequence has been established. Because of an absence of ethnographic reference to either the manufacture or the meaning of Vanuatu's rock art, spatiotemporal information is being investigated using formal methods (see Chippendale and Taçon 1998), such as absolute and relative dating, statistical analysis, and a cross-media analysis of archaeological and ethnographic decorated objects.

All fieldwork in Vanuatu is carried out in collaboration with the Vanuatu National Museum and the VCHSS, which operates within the Museum, and involves the training of field personnel of those organizations. During 1996 and 1997 funding was received to run a training excavation on Efate for VCHSS per-

sonnel. Museum and VCHSS staff have also received individual training in other aspects of archaeological work as part of this project, including survey and rock art recording.

ERROMANGO

Erromango, with an area of some 902 km², is the largest of the southern islands of Vanuatu (Fig. 3*b*). Visits to the island by archaeologists began in the early 1960s with a brief visit by the Shutlers (Shutler and Shutler 1966), who were followed by Les Groube in 1972 (Groube 1972). No ceramics were found on the island, and it was argued by some that Erromango (along with the rest of southern Vanuatu) had been colonized by preceramic settlers unrelated to the spread of the Lapita cultural complex (Green 1979:47; cf. Gorecki 1992). It was not until the research by Matthew Spriggs in 1983, referred to earlier, that ceramics were recovered from several sites on the island.

In 1994 Erromango again became the focus of archaeological research. Spriggs targeted a series of rockshelters and caves for excavation along the west coast at a range of altitudes from 5 to 125 m, where early Holocene and Pleistocene shorelines were preserved. Four sites were excavated in 1994, namely Velemendi, Velilo, Raowalai, and Ilpin (Fig. 3*b*). The earliest cultural deposit from any of the cave sites occurred at 5–10 m above sea level at Velilo shelter. It consisted of a shallow trench and several postholes, associated with a charcoal date of A.D. 600–1148 (ANU-9709). A date on marine shell taken from the former foreshore below the cultural layer returned a date of 2565–2303 B.C. (ANU-9710). The only other excavation that provided dates earlier than the last few hundred years was at Raowalai Cave, where charcoal and shell associated with burials was dated to A.D. 1028–1383 (ANU-9703) and A.D. 1324–1529 (ANU-9705), respectively. The next use of the site was the domestic use of a large stone oven that gave a carbon 14 determination of A.D. 1531–1950 (ANU-9702). The other cave sites returned radiocarbon determinations no earlier than the last few hundred years (see Tables 1 and 2). The lack of evidence for early use of these sites would be surprising if there were widespread occupation of the island before the Lapita expansion. The only pottery found on Erromango, with the exception of a single sherd in secondary, surface deposition in a cave, comes from village sites situated at prime settlement locations at river mouths and associated reef passages. Two examples of these, at Ponamla in the north and Ifo in the southeast, have been intensively investigated (see below).

The pattern of occupation on Erromango would fit a situation where Lapita agriculturalists and their immediate successors were moving into an empty landscape and were thus able to set up settlements in the prime locations for habitation and canoe access. Only later, as populations grew and people spread out from these prime locations, did the caves investigated in 1994 become part of the settlement system.

PONAMLA

In the last few days of the 1994 field season the open site of Ponamla was also visited and tested. The site's potential was recognized and brought to Spriggs'

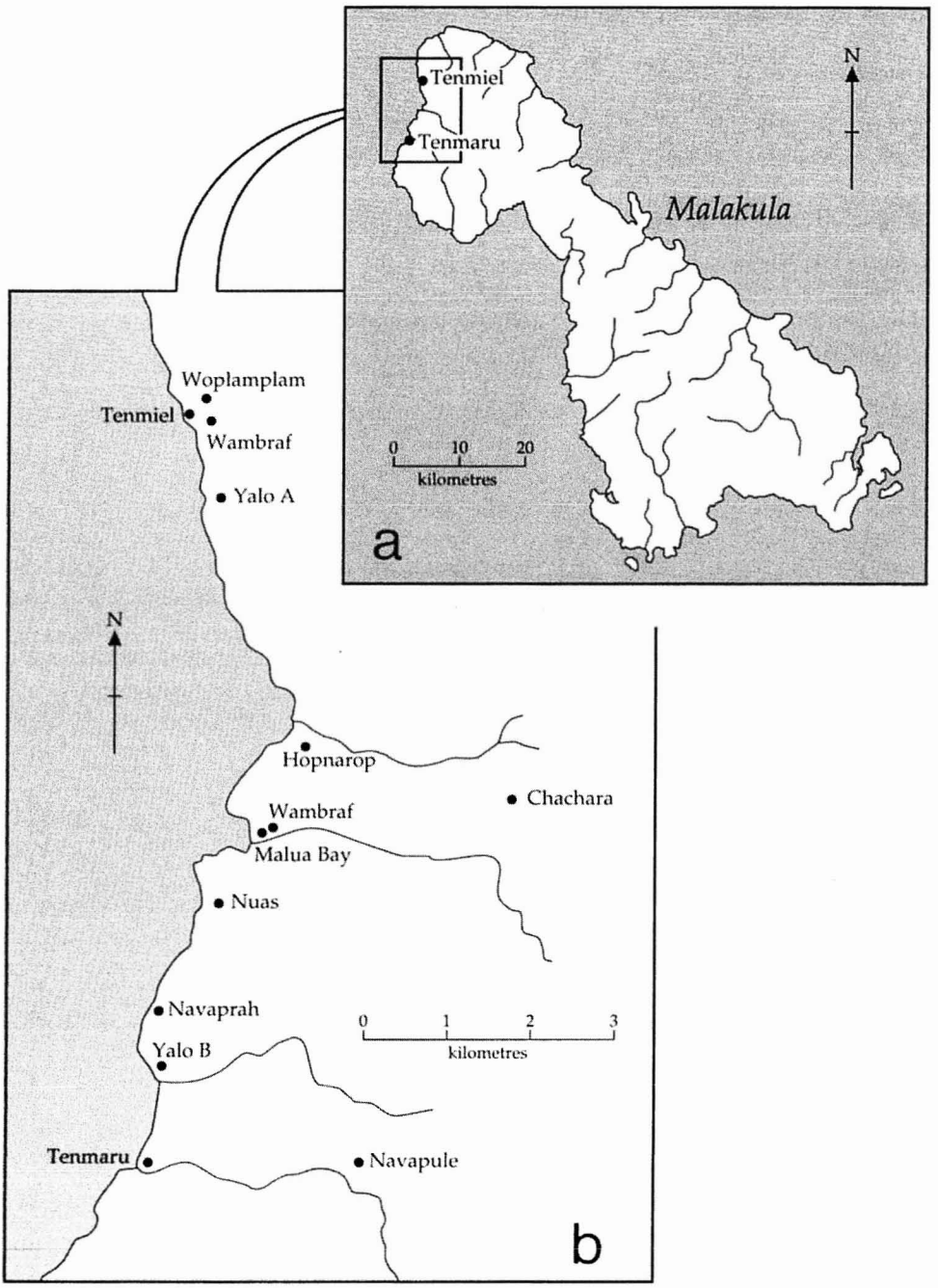

Fig. 2. *a*: Malakula, highlighting the northwest; *b*: Northwest Malakula.

attention by former Vanuatu National Museum fieldworker Sempit Naritantop, who identified pottery brought to the surface during posthole digging for a fence around the hamlet of Ponamla. The 1 m^2 test pit excavated in 1994 confirmed the site's rich potential. In 1995 Bedford and Spriggs returned to the site for over

TABLE 1. RADIOCARBON DATES FROM VANUATU ARCHAEOLOGICAL PROJECT

LABORATORY NUMBER	AGE (B.P.)	MATERIAL	CALIBRATED AGE (B.P. 2 S.D.)	SITE AND CONTEXT
Erromango				
ANU-9710	4290 ± 50	Marine shell	4515 (4399) 4253	Velilo 1994 (natural deposit, former coral reef)
ANU-9709	1220 ± 130	Charcoal	1350 (1170, 1160, 1150, 1100, 1090) 802	Velilo 1994 (lowest cultural layer, 110–128 cm bd)
ANU-9708	1460 ± 80	Charcoal	1526 (1340, 1320, 1310) 1189	Velilo 1994 (oven rakeout, 90–100 cm bd)
ANU-9707	1030 ± 60	Charcoal	1059 (950, 940, 930) 792	Velilo 1994 (oven feature, 60–70 cm bd)
ANU-9706	200 ± 70	Charcoal	427 (280,170, 150, 0) 0	Velilo 1994 (oven feature, 30–40 cm bd)
ANU-9703	810 ± 80	Charcoal	922 (730, 720, 700, 690) 567	Raowalai 1994 (55–65 cm bd)
ANU-9705	910 ± 70	Marine shell	626 (510) 421	Raowalai 1994 (shell associated with burial, 65 cm bd)
ANU-9704	350 ± 70	Charcoal	520 (430, 360, 330) 0	Raowalai 1994 (65–75 cm bd)
ANU-9702	200 ± 60	Charcoal	419 (280, 170, 105, 0) 0	Raowalai 1994 (35–40 cm bd)
ANU-9712	400 ± 120	Charcoal	646 (500, 490, 470) 0	Ilpin 1994 (oven fill, 54–57 cm bd)
ANU-9711	130 ± 48	Charcoal	285 (255, 223, 137, 30, 0) 0	Ilpin 1994 (charcoal from oven fill, 30–40 cm bd)
ANU-9714	370 ± 60	Charcoal	521 (460, 350, 340) 294	Velemendi 1994 (burnt log in oven section, 53–58 cm bd)
ANU-9716	230 ± 60	Charcoal	431 (290) 0	Velemendi 1994 (burnt log in oven section, 45–52 cm bd)
ANU-9717	139 ± 50	Charcoal	291 (259, 221, 139, 27, 0) 0	Velemendi 1994 (burnt log in oven section, 87–93 cm bd)
ANU-9718	181 ± 63	Charcoal	311 (270, 170, 150, 10, 0) 0	Velemendi 1994 (burnt log in oven section, 74–78 cm bd)
ANU-9713	177 ± 49	Charcoal	302 (273, 174, 146, 11, 0) 0	Velemendi 1994 (burnt log in oven section, 64–73 cm bd)
ANU-9719	96 ± 53	Charcoal	280 (60, 40, 0) 0	Velemendi 1994 (charred leaves in oven, 30–50 cm bd)
ANU-9507	2560 ± 140	Charcoal	2953 (2720) 2214	Ponamla 1994 (TP 1.1, 80 cm bd)
ANU-9508	2840 ± 70	Marine shell	2742 (2650) 2348	Ponamla 1994 (TP 1.1, 80 cm bd)
ANU-9509	2470 ± 90	Charcoal	2755 (2700, 2670, 2650, 2610, 2540, 2530, 2490, 2480, 2470, 2410, 2380) 2329	Ponamla 1994 (TP 1.1, 60–80 cm bd)

(*Continues*)

TABLE 1. *Continued.*

LABORATORY NUMBER	AGE (B.P.)	MATERIAL	CALIBRATED AGE (B.P. 2 S.D.)	SITE AND CONTEXT
ANU-9510	1660 ± 90	Charcoal	1775 (1540) 1333	Ponamla 1994 (TP 1.1, 40–60 cm bd)
ANU-10078	2550 ± 70	Charcoal	2776 (2718) 2358	Ponamla (TP 1.1, 190–200 cm bd)
ANU-10077	3040 ± 90	Marine shell	3006 (2776) 2673	Ponamla (TP 1.1, 150–160 cm bd)
ANU-10079	2550 ± 70	Charcoal	2776 (2718) 2358	Ponamla (TP 1.1, 100–110 cm bd)
ANU-10073	2620 ± 70	Marine shell	2452 (2305) 2114	Ponamla (TP 1.1, layer 1 [lower])
ANU-10297	2750 ± 70	Marine shell	2698 (2430) 2300	Ponamla (TP 1.2, layer 1)
ANU-10299	2590 ± 80	Marine shell	2435 (2290) 2049	Ponamla (TP 1.1, layer 1 46 cm bd)
ANU-10293	1670 ± 80	Charcoal	1772 (1540) 1354	Ponamla (TP 2.1, layer 1 lower)
ANU-10294	2690 ± 60	Charcoal	2920 (2780, 2770) 2720	Ponamla (TP 3, layer 3, 220–240 cm bd)
ANU-10295	2050 ± 70	Charcoal	2295 (1990, 1960, 1951) 1824	Ponamla (TP 5.4, layer 3)
ANU-10296	2680 ± 70	Charcoal	2921 (2760) 2715	Ponamla (TP 6, layer 6, 245–270 cm bd)
ANU-10298*	4060 ± 180	Marine shell	4544 (4080) 3602	Ponamla (TP 2.1, layer 1)
ANU-9723	1650 ± 70	Marine shell	1312 (1200) 1045	Ifo 1994 (shell exposed in bulldozed road)
ANU-9722	114.4 ± 0.8%M	Marine shell	Modern	Ifo 1994 (shell exposed in bulldozed road)
ANU-10521	3960 ± 80	Marine shell	4150 (3920) 3706	Ifo (SQ D2, former coral reef)
ANU-10520	2700 ± 80	Charcoal	2996 (2780) 2715	Ifo (SQ D2, 130–140 cm bd)
ANU-10523	2860 ± 70	Marine shell	2752 (2670) 2360	Ifo (SQ D2, layer 3, 100 cm bd)
ANU-10533	2170 ± 70	Charcoal	2339 (2150, 2140, 2120) 1950	Ifo (SQ D2, 85–110 cm bd)
ANU-10534	2510 ± 60	Charcoal	2749 (2710, 2580, 2570, 2560, 2540) 2354	Ifo (SQ D2, 65–85 cm bd)
ANU-10535	2690 ± 70	Charcoal	2949 (2780, 2770) 2717	Ifo (SQ D2, 50–70 cm bd)
ANU-10536	2810 ± 70	Marine shell	2728 (2530) 2332	Ifo (SQ D2, L.1, 65 cm bd)
ANU-10537	2780 ± 60	Marine shell	2704 (2470) 2327	Ifo (SQ D2, 85 cm bd)
ANU-10680	3120 ± 60	Marine shell	3047 (2870) 2751	Ifo (SQ D.4, L.4, 140 cm bd)
ANU-10681	3100 ± 70	Marine shell	3047 (2850) 2731	Ifo (TP 3, 150–180 cm bd)
Malakula				
ANU-10075	2450 ± 80	Charcoal	2744 (2619, 2610, 2465, 2454, 2436, 2433, 2415, 2378) 2329	Navaprah (TP A, 155–175 cm bd, lowest cultural layer)
ANU-10538	1240 ± 70	Charcoal	1297 (1170, 1160, 1150) 967	Navaprah (TP A, 115–130 cm bd)
ANU-10539	630 ± 50	Charcoal	668 (627, 596, 594, 582, 563, 531)	Navaprah (TP A, 75–95 cm bd)

(*Continues*)

TABLE 1. *Continued.*

LABORATORY NUMBER	AGE (B.P.)	MATERIAL	CALIBRATED AGE (B.P. 2 S.D.)	SITE AND CONTEXT
ANU-10540	510 ± 50	Charcoal	623 (525) 472	Navaprah (TP A, 50–75 cm bd)
ANU-10525	980 ± 60	Marine shell	650 (550) 481	Chachara TP C1
ANU-10526	145 ± 74	Charcoal	307 (260, 220, 140, 30, 0) 0	Woplamplam (TP 1, 80–105 cm bd, lowest cultural layer)
ANU-10529	1030 ± 70	Charcoal	1065 (950, 940, 930) 759	Wambraf (TP 1, 100–120 cm bd, lowest cultural layer)
ANU-10527	950 ± 70	Charcoal	968 (910, 860, 830, 810, 800) 691	Navepule A (TP 1, 55–65 cm bd, lowest cultural layer)
ANU-10528	2080 ± 70	Charcoal	2301 (2040, 2030, 2000) 1878	Navepule C (TP 1, 80–100 cm bd, lowest cultural layer)
ANU-10530	570 ± 50	Marine shell	292 (240) 0	Nuas (TP 4, 0–15 cm bd)
ANU-10522	2860 ± 70	Marine shell	2752 (2670) 2360	Malua Bay (TP 5.2, L. 4, 90 cm bd, lowest cultural layer)
ANU-10532	2400 ± 70	Charcoal	2718 (2360) 2208	Malua Bay (TP 5.2, L. 4, 80–90 cm bd, lowest cultural layer)
ANU-10524	1900 ± 80	Charcoal	1997 (1860, 1850, 1820) 1613	Malua Bay (TP 5.1, L. 3, 65–80 cm bd)
ANU-10531	1030 ± 70	Charcoal	1065 (950, 940, 930) 759	Malua Bay (TP 5.2, 40–65 cm bd)
ANU-10076	1930 ± 80	Charcoal	2040 (1875) 1630	Woapraf (TP 1, 175–200 cm bd)
ANU-10074	980 ± 80	Charcoal	1055 (923) 693	Bartnator (TP 1, 110–135 cm bd, lowest cultural layer)
Efate				
ANU-10658	2380 ± 60	Charcoal	2711 (2350) 2208	Mangaas (TP 4, 170–190 cm bd)
ANU-10659	2520 ± 60	Charcoal	2752 (2710, 2560, 2540) 2356	Mangaas (TP 4, 210–230 cm bd)
ANU-10657	2410 ± 60	Marine shell	2161 (2020) 1876	Mangaas (TP 4, 110–130 cm bd)
ANU-10656	220 ± 60	Charcoal	427 (280) 0	Mangaas (TP 4, 70–85 cm bd)
ANU-10655*	3690 ± 60	Marine shell	3723 (3590) 3443	Mangaas (TP 3, 220 cm bd)
ANU-10649*	98.5 ± 1.5	Charcoal	237 (62, 40, 0) 0	Mangaas (TP 3, 90–100 cm bd)
ANU-10650	2220 ± 130	Charcoal	2706 (2300, 2250, 2180, 2170, 2160) 1891	Mangaas (TP 3, 130–140 cm bd)
ANU-10651*	6190 ± 80	Charcoal	7249 (7160, 7120, 7110, 7080, 7070, 7060, 7050, 7040, 7030) 6822	Mangaas (TP 3, 150–160 cm bd)
ANU-10652	2850 ± 50	Marine shell	2727 (2663) 2429	Mangaas (TP 3, 170 cm bd)

(*Continues*)

TABLE 1. *Continued.*

LABORATORY NUMBER	AGE (B.P.)	MATERIAL	CALIBRATED AGE (B.P. 2 S.D.)	SITE AND CONTEXT
ANU-10653*	130.0 ± 2.4%M	Charcoal	Modern	Mangaas (TP 3, 170–180 cm bd)
ANU-10654	2290 ± 100	Charcoal	2708 (2330) 2006	Mangaas (TP 3, 210–230 cm bd)
ANU-10648	330 ± 60	Charcoal	511 (420, 390, 320) 0	Mangaas (TP 3, 30–50 cm bd)
ANU-10647	490 ± 60	Charcoal	623 (520) 339	Mangaas (TP 3, 25–30 cm bd)
ANU-10646	1660 ± 90	Charcoal	1775 (1540) 1333	Mangaas (TP 2, 120–130 cm bd)
ANU-10644*	103.3 ± 1.0%M	Charcoal	Modern	Mangaas (TP 1.2–1.3)
ANU-10641*	106.5 ± 2.4%M	Charcoal	Modern	Mangaas (TP 1, 110–130 cm bd)
ANU-10640	1310 ± 130	Charcoal	1517 (1260, 1190) 952	Mangaas (TP 1, 70–90 cm bd)
ANU-10642*	3040 ± 140	Charcoal	3551 (3240, 3230, 3210) 2790	Mangaas (TP 1, 160–170 cm bd)
ANU-10643	2480 ± 60	Marine shell	2295 (2120) 1958	Mangaas (TP 1, 160–170 cm bd)
ANU-10645*	1050 ± 60	Marine shell	698 (620) 517	Mangaas (TP 1.2–1.3)
ANU-10801	2180 ± 130	Charcoal	2613 (2150) 1857	Mangaas (TP 9, 60–80 cm bd)
ANU-10802	2960 ± 140	Charcoal	3444 (3160, 3150, 3140, 3130, 3110, 3090, 3080, 3070, 3060) 2761	Mangaas (TP 9, 90–100)
ANU-10803	2550 ± 110	Charcoal	2850 (2720) 2342	Mangaas (TP 9, 95–105 cm bd)
ANU-10800	2550 ± 130	Charcoal	2920 (2720) 2330	Mangaas (TP 9, 155–165 cm bd)
ANU-10798	2420 ± 80	Charcoal	2738 (2430, 2420, 2360) 2209	Mangaas (TP 9, 175–185 cm bd)
ANU-10796	3050 ± 80	Marine shell	2990 (2790) 2695	Mangaas (TP 9, 195–205 cm bd)
ANU-10799	2790 ± 110	Charcoal	3206 (2920, 2910, 2850) 2721	Mangaas (TP 9, 195–205 cm bd)
ANU-10797*	1350 ± 180	Charcoal	1606 (1280) 925	Mangaas (TP 9, 205–215 cm bd)
Retoka				
ANU-10257	720 ± 70	Marine shell	485 (330) 245	Shell ornament from Roy Mata burials

* Denotes that dates are anomalous and have been rejected.
M = Modern; bd = below datum; TP = Test Pit; SQ = Square.

five weeks of excavation. The work was carried out with the assistance of Jerry Taki, the National Museum fieldworker, and a crew of local laborers.

Ponamla is a bay at the northern end of Erromango facing the island of Efate (Fig. 3*b*). It is a prime location for settlement with its sheltered bay facilitating canoe access and reliable freshwater supplied by the Ponamla River. The main site

TABLE 2. AMS DATES FROM VANUATU ARCHAEOLOGICAL PROJECT

LABORATORY NUMBER	AGE (B.P.)	MATERIAL	CALIBRATED AGE (B.P. 2 S.D.)	SITE AND CONTEXT
Efate				
OZC829	2340 ± 50	Charcoal	2461 (2344) 2204	Mangaas (TP 2, 210–220 cm bd)
OZC830	2450 ± 50	Charcoal	2729 (2486) 2346	Mangaas (TP 3, 270–290 cm bd)
OZC831	2090 ± 50	Charcoal	2148 (2039, 2016) 1930	Mangaas (TP 4, 110–130 cm bd)
Retoka				
OZC784	690 ± 80	Marine shell	479 (300) 136	Shell ornament from Roy Mata burials
OZC785	990 ± 125	Marine shell	762 (550) 386	Shell ornament from Roy Mata burials
Erromango				
OZC828	140 ± 45	Charcoal	288 (261, 218, 137, 25, 0) 0	Charcoal sample from hand stencil, Velemendi cave
OZC827	100.86 ± 0.59%M	Human bone	Modern	Velemendi, bone from oven

area appears to be a remnant Pleistocene alluvial terrace, subject to talus slope encroachment from the limestone hill slope at its eastern edge. Ponamla is a relatively undisturbed settlement site with cultural deposits dating from c. 850/750 to 450 B.C. (see Table 1 for summary of dates). An areal excavation revealed what appeared to be a former cooking area, possibly also associated with pottery production. The presence of ash, charcoal, and cooking stones, mixed with shellfish and faunal material (including turtle and now-extinct bird bone restricted to the lower levels), indicated that the remains from hearths and ovens were being deposited in this area. Thousands of sherds, along with an assortment of other artifacts, such as Tridacna adzes and arm rings, conus shell rings, shell beads, a drilled shark tooth, bone needles, scoria abraders, and stone flakes, were recovered. Structural features were also recorded at the site. These were stone terraces that appear to have been constructed to form flat areas for the construction of houses and/or activity areas. At least three levels of structural features were identified within the almost 2 m deep cultural deposit (Spriggs in press). The consistent and tight range of radiocarbon dates and the evidence for stylistic change in pottery within the deposit indicate the stratigraphic integrity of the site.

The ceramics recovered from the Ponamla excavation were very similar in form and fabric, the most discernible change being from a predominance of plainware in the earliest layers of the site from around 850/750 B.C. to increased proportions of decorated ware (largely linear incised and fingernail impressed) in the upper layers dating to around 450 B.C. The pot forms consist almost solely of globular cooking vessels with outcurving rims. Numerous clay wasters were found throughout the excavation, indicating that the pots were being made on the site. One sherd of classic dentate-stamped Lapita was also recovered from the site in secondary deposition.

Ponamla appears to be a secondary colonizing settlement on Erromango, a few

hundred years after it was first settled by Lapita colonists possessing the full suite of dentate-stamped ceramics (see Ifo section). People arrived to colonize the area c. 850 B.C. at a time when dentate-stamped Lapita was no longer being produced. Initially plainware dominated, but over time fingernail and incised ceramics appeared. People moved into a pristine environment and commenced an intensive exploitation of the local fauna and marine resources. There is some indication of abandonment after 450 B.C., probably because of two factors: resource depletion and the attraction of other readily available pristine environments. People do not return until c. A.D. 350 (A.D. 175–617 [ANU-9510] and A.D. 178–596 [ANU-10293]), when there is evidence of an ephemeral use of the area. People leave with the ceramic tradition intact and return without. The initial occupation was relatively short and intensive with ceramics that are culturally transitional between Lapitoid plainware and incised traditions.

IFO

This site is located on the southeast coast of Erromango (Fig. 3*b*), a coast that comprises an extensive area of recently raised coral reef known as the Imponkor Limestone. Although tectonic uplift has increased the chances for the preservation of the earliest settlement sites, the raised coral reef along most of the southeastern coast also presents a very hostile environment in terms of canoe access. In 1983 a number of ceramic sites were recorded along the east coast, located near reef passages or at river mouths and associated with beach ridge formations (Spriggs and Wickler 1989).

Ifo is located a few hundred meters from the shore, on the north bank of the Ifo river, which provides canoe access. The site is concentrated on a series of linear ridge formations. A number of these ridges run parallel to the river and appear to be former beach ridges, while others run at right angles and are primarily made up of cultural material. Scattered cultural material was noted over an area covering some 60 × 80 m. The site is some 10 m above sea level.

During the 1983 fieldwork, Spriggs and Taki along with members of the local community excavated 5 m^2 of a 6 × 1 m trench across one of the ridges. Recovered pottery included one dentate-stamped Lapita sherd in secondary deposition, along with post-Lapita pottery, largely decorated with fingernail impressions. Shells from the lowest cultural layer of the ridge returned radiocarbon dates of 517–174 B.C. (Beta-7673) and 729–331 B.C. (Beta-7674). The ridge appeared to be an in situ cultural deposit with charcoal, shellfish, cooking stones, and numerous ash lenses.

Bedford returned to this site for six weeks in June and July of 1996, again working with Jerry Taki and the local community. After an intensive test-pitting program to determine the area of the site and any temporal/spatial variance (fifteen 1 m^2 test pits across the whole site), it was found that the most productive and undisturbed ridge at Ifo was the one that Spriggs and Taki had tested in 1983. Upon completion of the test-pitting program, a larger area on the same ridge was excavated. Two parallel trenches some 5 m apart and on either side of the ridge were excavated from the edge of the ridge into the center and were connected by a trench along the spine of the ridge, a total area of 16 m^2. This strategy was

employed to gain information on the structure of the ridge and how it was formed.

The ridge comprised a central core of flattish coral cobbles on top of a relatively level degraded coral subsurface. These flattish coral blocks appear to have been the result of people clearing a flat area on first arrival. Similar scattered coral blocks in uncleared areas can be seen farther toward the coast. Once these linear piles of coral had been formed they appear to have served as a focus for the dumping of cooking debris and refuse. Such dumping is a practice that is still seen in Vanuatu today. Living areas are cleaned daily and over time mound features of dumped material are built up around their peripheries.

The ridge appears to have been formed from a series of relatively undisturbed, in situ dumping layers with a maximum accumulation of cultural material of around 1.5 m. Cultural material was recovered from throughout the ridge feature. A date of 2200–1756 B.C. (ANU-10521) on marine shell was returned from the interface of the cultural material and the reef, giving an indication of the age of the reef surface. At the lowest level of the mound (layer 4), below and among the coral blocks, cultural material associated with Lapita settlement was recovered. The ceramics include dentate-stamped and finely incised sherds from a number of different vessels along with numerous plain sherds. The ceramics at this lowest level were associated with bones of large birds, turtles, and fruit bats as well as shell adzes and armrings. Large amounts of shellfish were also recovered, several species of which were said by local people to be no longer available in the area. A charcoal sample from this layer (layer 4, 130–140 cm below datum) has returned a date of 1046–765 B.C. (ANU-10520). Two shell dates from the same layer have returned dates of 1097–801 B.C. (ANU-10680) and 1097–781 B.C. (ANU-10681). Stylistically later incised Lapita with accompanying circle designs ("Lapita *géometrique*," Frimigacci 1974) was found in the upper level of layer 4. Just above this layer, at 1 m below the datum, a shell date of 802–410 B.C. (ANU-10523) was produced. There is a plainware component (globular pots with outcurving rims) present with both the Lapita occupation and the post-Lapita materials, although not with the same predominance as seen in the material from Ponamla, which was nearly all plain.

The Lapita ceramics are followed by globular pots with fingernail and incised decoration with outcurving rims. These are again very similar to the decorated sherds recovered from upper levels of Ponamla and are of similar age. Thus far dates of 389–0 B.C. (ANU-10533), 799–404 B.C. (ANU-10534), and 754–377 B.C. (ANU-10537) have been obtained. This material is followed in turn by globular pots with incurving rims and largely fingernail impressed designs that may correspond to the c. 350 B.C. dates received from the 1983 excavations. The essential change is from a predominance of outcurving rims to a predominance of incurving rims.

Finally, near the top of the mound, thick sherds of several crudely made and roughly incised globular pots occur with a much less incurving rim and more open mouth. This material would appear to signal the final phase of the ceramic tradition on Erromango, probably around 2000 years ago. Only one date has been returned from the uppermost layer, 778–382 B.C. (ANU-10536) on marine shell from layer 1, some 65 cm below the datum. Disturbance by more recent activity

may make precise dating of the end of the ceramic sequence somewhat difficult at this site.

An unusual item recovered from the excavations was a distinctive Erromangan artifact, an example of shell money or *navela*. It is a large piece of worked Tridacna shell, similar to those traditionally exchanged during marriage ceremonies (Humphreys 1926:171–172). Examples of these are still held by some people on Erromango today. The excavated example was recovered from the pottery-bearing levels. A charcoal sample from the same level returned a radiocarbon date of 389–0 B.C. (ANU-10533), indicating this tradition is at least 2000 years old on Erromango.

THE ERROMANGO SEQUENCE

The two sites of Ponamla and Ifo on Erromango have produced a wealth of ceramic material, the sequences of which appear to add further strength to the argument of a basic cultural continuity in Vanuatu between Lapita and the cultures that followed (Bedford in press; Spriggs 1997*b*). First settlement of Erromango occurred around 3000 years ago with the arrival of Lapita colonists. It appears that ceramics produced on the island were used for up to 1000 years, until production ceased around 2000 years ago. At Ponamla the ceramic sequence is visible in detail for part of its development, with almost 2 m of cultural stratigraphy accumulating over 300–400 years. An early plainware phase is in evidence there, followed by incised and fingernail-impressed ware. This represents a shorter and more intensive occupation than that which took place at Ifo. At Ifo a similar depth of material has accumulated over a longer period, perhaps up to 1000 years, somewhat compressing the sequence. We thus have examples of the full ceramic sequence from Erromango: Lapita to post-Lapita to end of use and manufacture. The material recovered from Ifo, when combined with that recovered from Ponamla, creates a much clearer picture of the previously somewhat confused ceramic chronology of central and southern Vanuatu.

ERROMANGO ROCK ART

A total of twenty-five rock art sites have been recorded on Erromango in the western, southern, and eastern coastal areas of the island. The rock art displays a change in the structural organization of motifs, occurring in conjunction with changes in technique, motif content, and motif frequency. A few examples of superimposition demonstrate that an early repertoire of deeply incised, pecked, and/or abraded motifs, which are essentially nonfigurative (e.g., enveloped crosses, cupules[4]) and distributed on discrete and definable areas of limestone and other surfaces, was superseded by a randomly distributed group of shallow incised and black (charcoal and manganese; painted and drawn) linear motifs, mainly rectilinear figurative and nonfigurative types (see also Table 3). The configuration and structure of the rock art, which is assumed to be among the earliest, is identical to patterns observed on Maewo and Malakula.

Establishing the extent and nature of the similarities and differences between rock art and pottery—two of the more enduring components of the archaeological record—is a major focus of this research. The idea to pursue such a cross-

TABLE 3. RELATIVE CHARACTERISTICS OF ROCK ART IN VANUATU

CHRONOLOGY	COMPONENT	MOTIF RANGE	REPETITION OF A MOTIF AT A SITE	SUPERIMPOSITION
Pigment rock art				
Early	Stencils (red and black) To symmetrical (red and black)	Small	Common	Never (except black hand stencils, which probably continue throughout the sequence)
Recent	To asymmetrical black linear	Extremely large	Rare	Common
Engraved art				
Early	Pecked, pecked and abraded, abraded, deeply incised	Small	Common	Never
Late	Incised	Large	Rare	Occasional

N.B.: The date ranges for each component (and whether these components overlap in time or are temporally discrete) cannot be assessed until absolute dates on the rock art have been obtained. This table is based on general patterns of superimposition found across Vanuatu, although localized discrepancies do exist.

media analysis derives from observations by Specht (1979), Rosenfeld (1988), Roe (1992), and others who suggest the prehistoric transmission of motifs and organizational principles between engraved rock art, pottery, and other designed media in the western Pacific region.

The black linear rock art of southern Erromango is of particular interest. Despite the fact that there is no contemporary knowledge of the manufacture or meaning of this rock art, there is local recognition of some of the motifs as traditional designs, many of which appear on a range of ethnographic media that were still being manufactured in this century (Huffman 1996), including barkcloth and barkcloth beaters, bamboo water-holding tubes, combs, grass skirts, and tattoos. Certain organizational principles associated with this rock art are also matched on the more recent pottery of Vanuatu and the nearest island groups of Fiji, New Caledonia, and the Solomons. Forthcoming absolute dates will test the assumption that black rock art is a recent phenomenon of the last 1000 years. We have received one AMS date thus far of A.D. 1662–1950 (OZC828), obtained from a black hand stencil on the walls of Velemendi.

MALAKULA

The northern island of Malakula (see Fig. 2*a*), the second largest in Vanuatu at some 2024 km^2, was targeted for research for several reasons. The island experiences regular tectonic uplift with some of the highest rates in the whole of Vanuatu, particularly in the northwest where it is estimated to be some 3 m per 1000 years (Taylor et al. 1980 : 5369). The coastal landscape comprises a series of uplifted coral terraces riddled with caves and shelters, many of which contain rock art. Pottery is found on the ground surface literally all over the island. It was made until recent times, dying out perhaps around the time of European contact. There is no folk memory or oral tradition associated with it in the northwest,

unlike in southern Malakula (Deacon 1934). Malakula has had a minimum of archaeological attention in the past. It was briefly visited by the Shutlers (Shutler and Shutler 1975) and Caroline Leaney (Leaney 1965) in the 1960s. Extensive surface collections were made, but the research remains almost completely unpublished. Very little is thus known of the island's archaeology. Potentially it has at least a 3000-year ceramic sequence, and is an ideal area where pre-Lapita settlement could be sought.

Bedford, working with Vanuatu National Museum fieldworker Jimmyson Sanhanbath, began work in the northwest of Malakula in 1995. That work consisted of an intensive survey along a 10-km stretch of the northwest coast (Fig. 2*b*) from Tenmiel to Tenmaru, along with forays some kilometers into the interior. A number of perennial streams drain from the interior and are often associated at their mouths with sheltered bays. These bays are thus prime areas for settlement. Malo Island, with its numerous Lapita sites (Hedrick n.d.), can be seen clearly from the northwest.

Some fifty caves and shelters or overhangs were recorded at varying altitudes. Ten were targeted for excavation, mostly between 20 and 40 m above sea level with one at 80 m above sea level. The stratigraphy of the caves was relatively consistent, generally representing intermittent occupation with ash lenses from cooking fires, fire-cracked basalt river cobbles, shellfish, bone, and relatively sparse artifactual material. Ceramics were found throughout the stratigraphy of the caves including the earliest cultural levels. The pottery in the lowest cultural contexts at the sites was a thin-walled plainware with calcareous temper. The pots were globular in form with outcurving rims, some of which had notched lips. It appears to be comparable to the plainware from Erromango and Efate. The earliest date from the caves for the thin plainware is 794–379 B.C. (ANU-10075), from the lowest cultural level at the coastal cave of Navaprah. Similar pottery was dated at 90 B.C. to A.D. 320 (ANU-10076) from another coastal shelter, known as Woapraf, from near the bottom of the cultural deposit. From the later levels at Woapraf, large, thick, undecorated sherds from ovoid pots and sherds from cylindrical pots were recovered.

In inland areas (up to 250 m above sea level) are numerous abandoned village sites and associated ceremonial stone structures. These consist of rough, rectangular or square platforms associated with grade-taking ceremonies, dancing grounds (*nasara* in Bislama, the lingua franca of Vanuatu) and men's houses (*nakamal*). These sites appear to have been relatively undisturbed since abandonment. Concentrations of firecracked rock, charcoal, and pottery were recorded. The pottery is mostly thick coarse ware, ranging in form from globular to cylindrical pots. These pots occur as plainware and in a multitude of highly decorated wares utilizing incised, punctate, fingernail, and carved techniques. The same pottery is found all over the island, in both coastal and inland locations, and appears to represent the final phase of the ceramic sequence.

Building on the information gleaned in 1995, Bedford returned in 1996, again excavating a number of caves in different locations along the coast and further inland at various altitudes. The further excavations of the caves in more marginal areas of settlement, such as those with poor access to water or far from the coast, appear to confirm that these areas were occupied only in the last 500–1000 years. The cultural stratigraphy is generally shallow and associated with ceramics that are

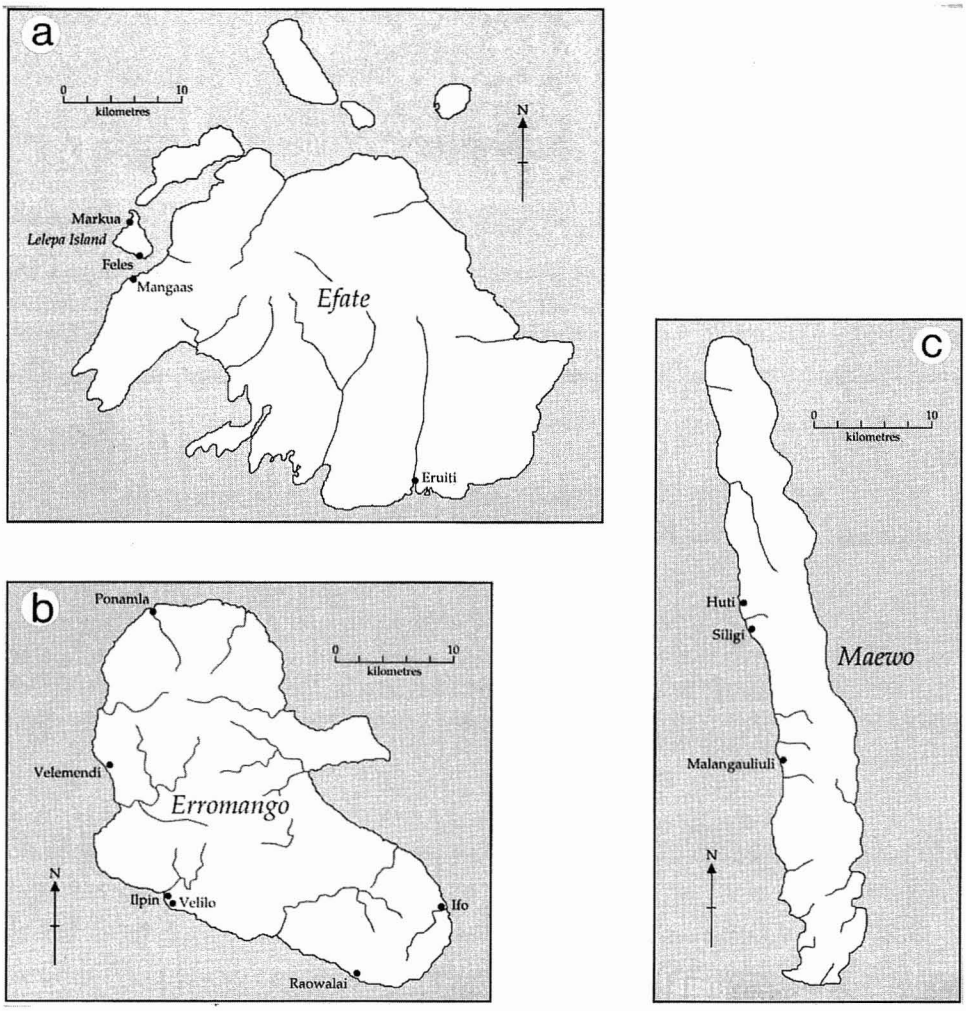

Fig. 3. a: Efate; b: Erromango; c: Maewo.

commonly found in surface collections. Examples of this are the two cave sites of Woplamplam and Wambraf at Tenmiel (Fig. 2*b*). Both caves are near the coast but are far from a reliable water source. The stratigraphy at the caves was up to 1.2 m deep, but the dates obtained from the lowest cultural levels were relatively late, A.D. 1643–1950 (ANU-10526) and A.D. 885–1191 (ANU-10529), respectively.

Further examples of relatively late use are Navapule A, B, and C, a complex of three caves. The three cave sites are located some 1.5 km from the coast and about 200 m above sea level. Rock art was present in all three caves and fresh water is some ten minutes walk away. Over four days, 2 × 1 m test pits were excavated in all three caves near their entrances. The pattern of stratigraphy was similar in all of the caves. Evidence for intermittent occupation included fireplaces or rake-out from fireplaces at different levels, interspersed with layers of sterile soil indicating periods of non-use. Shellfish, bone, and pottery were

recovered from the sites. The pottery from the caves was very similar in all levels of the excavations and appeared to be late, dating to within the last 500 years. This material supports the idea that the more inland areas of Malakula were settled considerably later than the coast. Dates from two of the caves indicate that first use was somewhat earlier than initially thought but may not be associated with recovered pottery. From the lowest cultural levels of two of the caves, dates of A.D. 982–1259 (ANU-10527, Navapule A) and 351–72 B.C. (ANU-10528, Navapule C) have been obtained.

Open ceremonial sites were also targeted for excavation in 1996. Chachara was an inland abandoned village and ceremonial site, 2 km from the sea at an altitude of 250 m. A series of 1 × 1 m test pits were excavated across an area with concentrations of pottery and fire-cracked rock, some 10 m from one of the rectangular rock platforms. It soon became obvious that the material was very much restricted to no more than 20 cm below the surface. Another area was tested and produced a somewhat greater variety of material. This was a mound feature close to another rectangular rock structure. This mound/ridge feature seemed to have been formed in a very similar fashion to those at Ifo on Erromango, by people initially clearing the area for gardening or habitation and the mound features acting as foci for the dumping of refuse. A 4 × 2 m area was excavated across the mound. The central core was made up of a concentrated assortment of limestone rocks and black soil. Cultural material was recovered below and among the rocks. This included numerous fragments of pottery, a shell adze, animal bone (mostly pig), and shellfish. A radiocarbon sample of marine shell returned a date of A.D. 1300–1469 (ANU-10525).

This late date corresponds with the form and decoration of the recovered ceramics and suggests that this site type generally dates to within the last 600 years. The sites consist of ephemeral surface remains, largely cooking debris, and some large stone platforms associated with ceremonial activity. The abundant pottery indicates a thriving industry up until the last few hundred years. The concentration of such sites across the northwest area of Malakula suggests that the area was far more densely populated than historical records suggest and that there was significant depopulation with European contact.

Nuas was another abandoned village and ceremonial site, nearer the coast and only 100 m above sea level. The site was very similar to Chachara, with cultural remains on the ground surface and associated rectangular stone structures nearby. This site was tested as a comparison with the inland site. A series of test pits was excavated across an area of concentrated pottery and shellfish. The stratigraphy was very shallow and the pottery all appeared to be of the late style. These factors indicate that this site type was late in the cultural sequence. A radiocarbon sample on marine shell from the site returned a date of A.D. 1658–1950 (ANU-10530).

MALUA BAY

Malua Bay was the site of another open area excavation. It is a sheltered bay with a sandy beach and a perennial stream at one end that has rapidly downcut through earlier deposits, carving a ravine rather than meandering back and forth along the coastal plain. Malua Bay seemed an ideal area for settlement along this 10 km stretch of coast, and its early attraction was confirmed after the excavation of

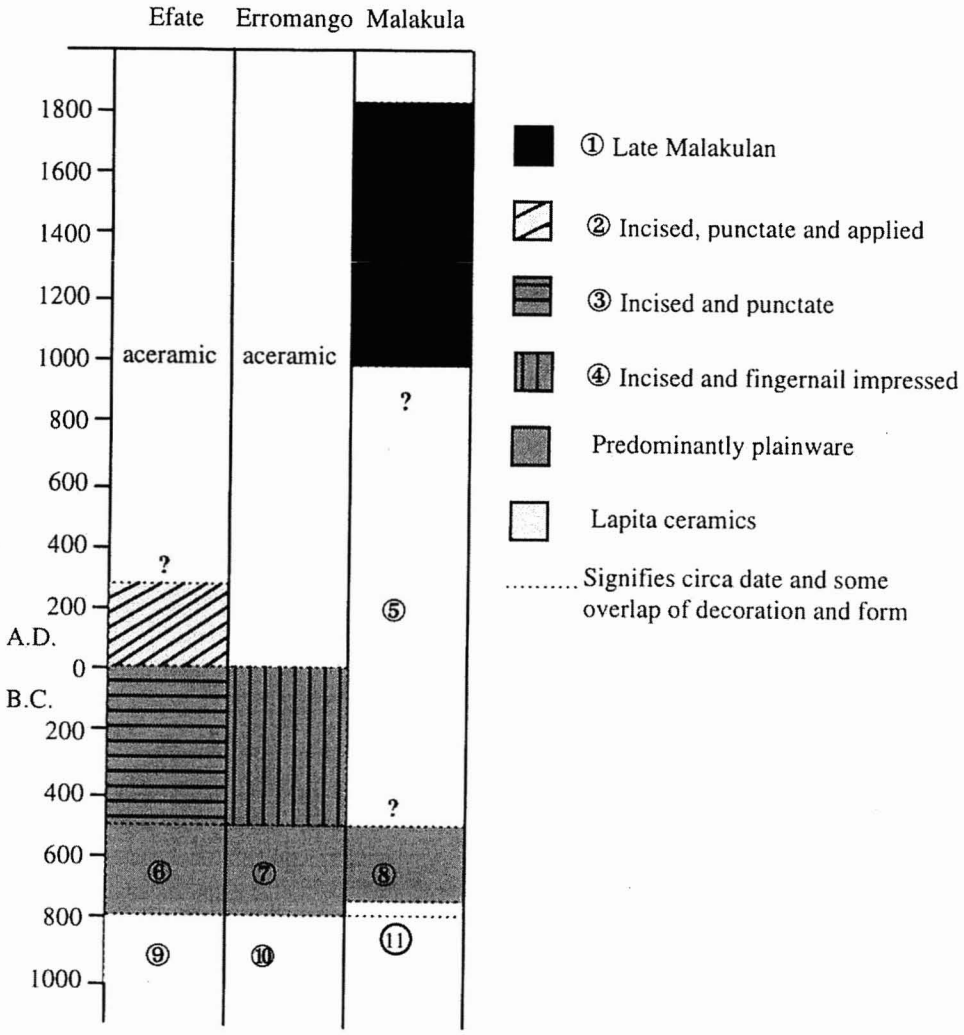

Fig. 4. Preliminary Ceramic sequences for Efate, Erromango, and Northwest Malakula, Vanuatu. 1: Late Malakulan is identified by a proliferation of decorative techniques and vessel forms (see text) that appear to continue until European contact. 2: Late phase ceramics from Mangaas site are typified by applied relief, but decoration includes incision and punctuation. 3: Middle phase ceramics from Mangaas site are dominated by incised and punctate decorated material. Pots are generally globular with incurving rims. 4: Incised and fingernail impressed decoration was found at both Ifo and Ponamla on globular pots with outcurving rims from the end of the Ponamla sequence. The decoration continues at Ifo (after Ponamla) but on globular pots with direct or incurving rims that are similar to material from the Mangaas site. 5: Large gap in ceramic sequence on Malakula. Early plainware and later materials from excavations in the Northwest cannot be linked. 6: Plainware with frequent notching on outcurving rims, as found at Mangaas and Erueti. Minor incised component. 7: Plainware and globular pots with outcurving rims were dominant at Ponamla and present at Ifo. 8: Plainware from Malua Bay and Navaprah was similar to Ponamla material. 9: Lapita dentate ceramics were recovered from Erueti. 10: Lapita dentate ceramics were recovered from Ifo plus one sherd from Ponamla. 11: One dentate stamped sherd was recovered from the Malua Bay site.

several test pits. Evidence of first arrival and/or settlement in the northwest area was found some 15 m above sea level on a remnant beach terrace in the garden of the local school. A total of 14 m^2 were excavated to determine the extent and stratigraphy of the site and sample the cultural material. The site covered an area of some 50 × 30 m.

The stratigraphy was relatively straightforward, comprising four layers. Layer 1 consisted of a mixed black garden soil from the surface to some 30 cm deep. Pieces of late-style ceramics (thick-walled decorated sherds) were found in this layer. Layer 2 was a light brown silty material that appeared largely sterile. It may be that this layer is at least in part made up of a volcanic ash. Dramatic volcanic activity from the nearby island of Ambrym has regularly deposited ash on southern Malakula, and this may come from one of the major eruptions there. The material is also being compared to ash samples from the massive Kuwae eruption of A.D. 1452 (see below). A radiocarbon date of A.D. 885–1191 (ANU-10511) was recovered from the interface of this layer and the cultural layer below.

Layer 3 at some 50 cm below the surface was a black soil with concentrated gravel and frequent basalt cobbles plus cultural material that appeared to be largely cooking and midden remains. The layer was very hard-packed and on average was some 25 cm thick. The concentrated gravels in layer 3 look very much as if they have been transported into the area to build up a clean dry surface, a practice that is still seen at Malua Bay today. Two charcoal samples have been assayed from this layer and returned dates of 768–258 B.C. (ANU-10532) and A.D. 47–337 (ANU-10524). Layer 4, at some 75 cm below the surface, was a dirty, compacted beach sand, essentially the interface between the cultural layer and the sterile former sand beach. A shell sample from this layer returned a date of 802–410 B.C. (ANU-10522).

The recovered materials from layers 3 and 4 include large quantities of thin plainware sherds (some sherds are only a few millimeters thick) with calcareous temper. The pots appear to be globular with outcurving rims, and some sherds have fine notching on the lip. The plainware is the same as that recovered from Navaprah. One dentate stamped Lapita sherd was also recovered from among this material. Other artifactual material includes part of a Conus shell ring, an ear pendant, and a small argillite adze. Pig, sea turtle, bird, fruit bat, and rat bone were also recovered, along with quantities of shellfish (some species of which are no longer available in the area) and fish bone.

THE MALAKULA SEQUENCE

Malua Bay appears to be a relatively short-term occupation in a premium area for settlement, providing direct access to fresh water, a sheltered bay with easy canoe access, and abundant natural resources. After some time, probably because of resource depletion and the attraction of other pristine environments as in the Ponamla case on Erromango, people moved on. The area was reoccupied at a later date by people possessing a different ceramic tradition. As populations increased, more marginal areas were settled, including some of the cave sites that were investigated. There are also hints of this scenario in the stratigraphy of some of the cave sites, where we find initial settlement followed by a period of abandonment and later resettlement. A common factor in the Malakula and Erro-

mango cases is that the sites investigated are located in dry leeward areas of the islands, and initial colonization may have had more devastating effects on such areas than would have been the case in wetter regions. For instance, we might expect poor forest regrowth after clearance and more marginal agricultural production given the rainfall regime.

The archaeology of Malakula is far from complete, but an understanding of settlement patterns is beginning to emerge. The earliest settlements were concentrated on the coast around sheltered bays with reliable water sources. It is not until sometime later that permanent settlement shifts inland and also to more marginal areas of the coast. There is a possibility that after settling the area and making full use of the resources to the point of depletion, people may have moved on to another island or another part of Malakula, the northwest area being resettled at a later date.

Segments of the ceramic chronology for the northwest are being revealed. It can now be confirmed that the lengthy pottery tradition began with the arrival of Lapita peoples, although the relationship of that material to the later material still needs refinement. Pre–1000 B.C. settlement is looking increasingly less likely. There was certainly no suggestion of any evidence of pre-Lapita settlement in any of the fifteen excavated cave sites on the island.

MALAKULA ROCK ART

The same techniques, forms, and organizational principles as those found on Erromango were used in the earliest rock art produced in northwest Malakula. Engraved cupules, circles, circles with central dots, and "mask faces" are among the dominant early motif types that are consistently superimposed by later motifs produced with different techniques, including, again, black linear rock art. A total of twenty-two rock art sites was recorded in the area.

One of the more distinctive similarities between the engraved rock art of Erromango and Malakula is in relation to the structure and configuration of cupules. On both islands, cupules configured in horizontal rows are commonly located along protruding surfaces of caves or shelters, in areas that receive natural light, and/or at site entrances.

Prominent features of Malakulan rock art are the black stencils (particularly hand stencils) and black linear motifs. One way of defining these motifs is in relation to their proximity to engravings. At the two largest cave sites in the area (Yalo A and Yalo B), the main chambers consist mostly of engravings, while the black stenciled and painted rock art occurs either above the engravings (on a lighter colored surface) or in separate areas of the cave.

Changes in the northwest Malakulan rock art sequence are also being explored in relation to changes in the local archaeological record. As outlined earlier, the oldest occupation sites in this region were concentrated at perennial fresh water sources on the coast, and more marginal habitation areas were settled later, particularly during the last 500 years. Absolute dates for the rock art will clarify this further, but there appears to be an increase in the amount of rock art produced in the last 500 years at sites that are far away from water sources and do not contain evidence of what is assumed to be the earlier art. Apart from absolute dating, the content and structure of motifs on dated pottery found in archaeological assem-

blages in northwest Malakula is being statistically compared to the rock art in the hope of locating the rock art within an archaeological context.

EFATE

In August 1996, Spriggs supervised four weeks of excavation at the Mangaas (formerly known as Mangaasi) site on the west coast of Efate, central Vanuatu. The research there is designed to develop further the pioneering work of Garanger on Mangaasi pottery, partly in light of the questions concerning the central Vanuatu pottery chronology raised by Ward in his 1979 thesis (see also Ward 1989). Garanger noted that he had some difficulty interpreting the stratigraphy of the site, and this is reflected in his summation of the ceramic chronology. Researchers have questioned the validity of Garanger's early to late Mangaasi ceramic sequence and his proposed termination date for pottery production and use. The 1995 Erromangan research also suggested new interpretations of the Mangaasi material.

Four test pits were excavated at Mangaas in 1996 near the earlier excavations carried out by Garanger, but farther inland. During 1997 Spriggs and Bedford extended the test pit transects farther inland and parallel to the present shoreline. The area has experienced tectonic uplift, estimated to be some 2 m in the last 3000 years. This was confirmed with the excavation of test pits adjacent to the area excavated by Garanger, which reached the former reef at 3.6 m below the ground surface. This was up to some 2 m below the basal levels of Garanger's earlier excavations in the same area and consisted of a series of former beach deposits. Water-worn pottery was found throughout the stratigraphy and although it was not possible to assign it to any particular style because of its condition, thin section analysis of the tempers carried out by Dickinson (1997) on a number of water-worn sherds from the lowest levels of the test pits has confirmed them as being of Efate origin. The presence of pottery in these levels suggests that people were dumping refuse onto the beach below the high tide mark from a settlement farther inland than the locations excavated in 1996. In situ deposits relating to this earliest occupation at the site were located and tested in 1997.

The excavations of 1997, again a series of 1 × 1 m test pits (one later enlarged to a 2 × 2 m area) located deeply stratified (up to 2 m) and rich cultural deposits that were relatively undisturbed. The stratigraphy of the site appears to be both horizontal and vertical. The main area of cooking and refuse dumping is concentrated along the bank of a small perennial stream and on the prograding beach, whose location was changing because of uplift. Intact cultural deposits comprised pottery, shellfish, bone, shell adzes, armrings, beads, and very occasional stone flakes.

A clear picture of the ceramic sequence from the Mangaas site has now emerged, despite some problems with anomalous radiocarbon dates. The sequence begins at about 850 B.C. (1040–745 B.C. [ANU-10796] and 1256–831 B.C. [ANU-10799]) with generally plain, everted-rim cooking vessels, frequently with notching on the lip. The flat form and decoration on the lip are very similar to the material excavated by Garanger at Erueti on the south coast of Efate (Garanger 1972: figs. 17–21), and called by him Erueti ware. Incision occurs as a

minor decorative technique on this early material. This plainware material was not recovered by Garanger in the excavations of the 1960s because the area excavated was located nearer the sea and dated to a later period, that of the incised and applied relief ware called by him Mangaasi ware. There is an increasing proportion of pottery decorated with incising at about 550 B.C., and by about 150 B.C. the flat lips have largely dropped out to be replaced by simpler rim forms on incurving rim vessels decorated with both incising and punctate impressions.

Applied relief decoration so typical of Mangaasi ware appears only at the end of the ceramic sequence, perhaps after a hiatus in occupation of a few hundred years, along with both incised and punctate material and the appearance of handles. The applied relief pottery was recovered from the uppermost layers of the site or in test pits that were closer to the sea and clearly date to a later phase of occupation. Where the stratigraphy is not disturbed, applied relief pottery seems to date to a period after deposition of a tephra that may result from the Ambrym Volcano caldera-forming event of about A.D. 100 (Spriggs 1997*b*:178). So far, the only radiocarbon date clearly associated with applied relief pottery is A.D. 175–617 (ANU-10646). This pottery occurs in an occupation layer that seems to have been later subjected to disturbance through gardening activities and was in turn sealed by primary and secondary tephra almost certainly from the massive Kuwae eruption that created the present configuration of the Shepherd Islands to the north of Efate in A.D. 1452 (Robin et al. 1994). Much of the area excavated by Garanger appears to have been disturbed by tidal wave deposits probably associated with the same eruption. Thus his pottery sequence was largely a product of post-depositional sorting of occupational deposits that we can now determine are late in the sequence at the site.

At the Mangaas site, as in the sites of Ponamla and Malua Bay, we may again be seeing a population arriving in a pristine environment, staying for several hundred years, and moving on to other islands or other areas of the same island once resources become less easily accessible. Thus we cannot determine when pottery use was abandoned on Efate from the evidence at Mangaas, because abandonment apparently occurred while pottery was still in use. Indications thus far, however, point to the incised and applied relief tradition as representing the end of ceramic production on Efate. Certainly there are no other distinctly different ceramic collections illustrated by Garanger, who also made extensive surveys and surface collections along most of the coast of Efate. Mangaas was abandoned or used intermittently for gardening and then was resettled following the Kuwae eruption. The reoccupation dates to A.D. 1327–1611 (ANU-10647), A.D. 1439–1950 (ANU-10648), and A.D. 1523–1950 (ANU-10656).

Oral traditions link Mangaas to the legendary chief Roy or Roi Mata, whose burial site was excavated by Garanger on nearby Retoka, or Hat Island (Garanger 1972:59–77). Mangaas was said to be his house site and appears to have subsequently been abandoned as a taboo area until gardening use re-commenced in the 1920s. Roy Mata's grave site was originally dated rather uncertainly to the 1200s on the basis of a single date on human bone. As this was clearly an unreliable basis for dating the site, Garanger provided Spriggs with three samples of shell ornaments from the grave. These support the dates from the uppermost Mangaas occupation in suggesting a later period for Roy Mata, certainly postdating the Kuwae eruption (A.D. 1471–1814 [OZC784] and A.D. 1188–1564

[OZC785]). Oral traditions (Espirat et al. 1973) concerning Roy Mata are somewhat confused on when he lived, some indicating (as noted by Garanger 1972:77) a period prior to the eruption, but others indicating a more recent period. The redating of the Roy Mata grave site and the dates from the uppermost occupation at his supposed house site suggest he may have lived in the 1600s.

EFATE ROCK ART

The only rock art recorded in the Efate region as part of this project was on Lelepa Island, across a narrow strait from the mainland and opposite the site of Mangaas. Garanger (1972:36–37, 40) reported two caves on Lelepa Island that contained rock art: Feles and Markua (Fig. 3*a*). The rock art in these caves was rerecorded by Wilson during the 1997 field season, and a test excavation was carried out at Markua in an attempt to obtain a minimum age for two hand-stencils (one red and one black) that were found to continue beneath the current ground surface. On the basis of superimposition, red hand-stencils are early in the relative sequence for rock art throughout Vanuatu (Table 3). Therefore the radiocarbon ages from the deposit immediately adjacent to the red stencil may provide some insight into the time depth of rock art production in Vanuatu.

MAEWO ROCK ART

Only rock art research was conducted on Maewo, with six sites recorded. Similarities with rock art from the other islands of Vanuatu were again identified. The configuration and structure of horizontal rows of cupules on Maewo is identical to patterns observed on Erromango and Malakula. Two of the rock art sites (Huti and Siligi, see Fig. 3*c*), located north of Kerebei, are boulders on which motifs associated with a local grade-taking ceremony known as *Gwatu* are found. The rock art at Siligi is referred to as *uliuliningwatu*, which translates as "writing of the Gwatu." It is said to have been produced around the time of the birth of the Creation Being, Tagaro. According to National Museum fieldworker Jeffrey Uli Boe, one of the motifs at Huti is a *tutugu*, which is the term for a headdress worn at the tenth and final stage of the *Gwatu* grade-taking ceremony.

Gwatu motifs are also evident at Malangauliuli, the largest rock art site known on the island. These are found together with motifs associated with the male *sungwe* and female *lengwasa* grade-taking ceremonies. An analysis of the spatial relations between these gender-specific motifs is in progress.

Although members of the local community do not recall the actual manufacture of the rock art of Maewo, some know the meaning of certain motifs. Motifs that have contemporary significance tend to be rectilinear in structure and, as on Malakula, Lelepa, and Erromango, knowledge of the repetitive curvilinear forms, such as circles with central dots, "mask faces," and cupule rows, is absent. Part of this study examines the relationship between "location" and "motif knowledge," with the intention of finding out whether motif types unfamiliar to the local community are early, and in turn, whether motifs people recognize are relatively recent. As is the case for the other recorded rock art in Vanuatu, motifs are being

compared to those found on other archaeological and ethnographic media for which dates are known, in an attempt to secure a temporal framework for Maewo's rock art. For instance, some of the rectilinear motifs in the rock art at Malangauliuli have been identified as resembling motifs on women's woven mats (Bolton 1997).

DISCUSSION AND CONCLUSIONS

The project has established that the archipelago was first settled by Lapita colonists some 3000 years ago and the ceramic sequences that followed evolved from the Lapita ceramic tradition and occurred in some sequence for up to 1000 years (Fig. 4). Lapita dentate-stamped ceramics appear to have largely disappeared after several hundred years, to be proceeded by plainware material, which in turn is followed, at around 550 B.C., by decorated wares. On Erromango the decoration is dominated by fingernail impression and linear incision, and on Mangaas (Efate) by incision and applied relief. Ceramics disappear from Erromango around 2000 years ago, and possibly up to 500 years later on Efate. The sequence on Malakula as noted previously is far from complete. Plainware with one Lapita dentate-stamped sherd was recovered from Malua Bay but no ceramics were recovered to link that earlier material with the material of the last 1000 years. It needs to be emphasized that these sequences are preliminary at this stage and will be further refined when the pottery has been analyzed in detail. The excavation of a series of cave sites in Malakula and Erromango in areas of rapid uplift have thus far produced no evidence for settlement of Vanuatu prior to 1000 B.C.

Patterns of initial settlement of Vanuatu are also emerging. Arrival, followed by intensive exploitation of resources, followed by abandonment and then movement to other islands or areas of the same island are suggested at several of the earliest excavated sites. The areas of initial settlement appear then to have been reoccupied at a later date. More detailed reports are being prepared on the recovered faunal and marine resources to further define the patterns of exploitation.

Some general patterns are emerging from the rock art research. A seemingly early component of relatively simple forms, such as engraved cupules, circles, "mask faces," and stencils of red and black pigment, occur throughout Vanuatu and demonstrate regional similarities in both content and structure. On the evidence of superimposition, this is superseded by a black linear and incised rock art that, although displaying regional consistencies in terms of technique and manner, is defined by regionally differentiated sets of motifs and incoherent structure.

There was little detailed rock art research carried out in Vanuatu until 1990. Since that time, a reconnaissance survey by David Roe (1996) and the VCHSS program have uncovered a large body of rock art in Vanuatu. Wilson's field seasons in 1996 and 1997 increased the number of sites known in Vanuatu from fifty (Roe 1996: fig. 93) to eighty-three. A large number of these have now been formally recorded and partially analyzed.

The rock art is both painted (wet and dry, stenciled and linear and/or infilled) and engraved (incised, pecked, and/or abraded). Paintings and engravings occur both together and independently at different sites. Site types include limestone caves and shelters, cliffs and outcrops, boulders (usually of volcanic origin), and

beach rock platforms. On the basis of superimposition of the techniques (and colors) represented in Vanuatu's rock art, a preliminary temporal sequence that applies to the majority of sites has been established (see Table 3).

The ANU-National Museum of Vanuatu Archaeology Project has succeeded in a number of its objectives and brought greater clarity to our knowledge of the early history of the archipelago. Ceramic sequences throughout Vanuatu have now been established, with some uniformity in stylistic change being recognized throughout the islands for the first 1000 years of ceramic production. The sequences can now be related more directly to those of the rest of Melanesia (Spriggs 1997*b*: 108–186). A tentative sequence of rock art has also shown applicability to several areas of Vanuatu. Parallel sequences of environmental change also are being established and will be reported elsewhere.

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NOTES

1. The palaeoenvironmental work will be published elsewhere and is not further discussed in this paper.
2. The Vanuatu Cultural and Historical Sites Survey (VCHSS) had been established in 1990. It was initially managed by Jean-Christophe Galipaud and David Roe and involved both extensive surveys and the training of local personnel, but until 1994 no significant excavation was part of its program.
3. All radiocarbon dates in the text include their laboratory number and the calibrated date at two standard deviations using the Calib program version 3.1 of Stuiver and Reimer (1993) with delta R as 0 for marine samples (see Tables 1 and 2 for full list of dates).
4. Cupules are defined here as engraved (usually abraded) circular depressions, often configured in rows (horizontal or vertical); see Taçon et al. 1997.

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ABSTRACT

Despite an intensive period of research in Vanuatu in the 1960s and 1970s, a number of basic questions regarding the archaeology of the archipelago have remained largely unexplored. The Australian National University–National Museum of Vanuatu Archaeological Project, which began in 1994, was established in an attempt to rectify some of these archaeological gaps. Research has been carried out on islands in the northern (Malakula, Maewo), central (Efate), and southern (Erromango) regions of Vanuatu. The work has concentrated on establishing ceramic sequences for the different islands and on a further understanding of the rock art, including its meaning and changes through time. The evidence collected thus far overwhelmingly indicates that the islands were initially colonized some 3000 years ago by Lapita settlers. Negative evidence thus far indicates that the islands were not settled prior to the arrival of Lapita colonizers. Dentate-stamped Lapita ceramics arrived with the initial colonizers and the ceramic traditions that followed evolved from the Lapita tradition. KEYWORDS: Vanuatu, Lapita, Mangaasi, ceramic sequences, rock art, radiocarbon dates.